

The nidification of some common Indian birds—Part 2

BY

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2. THE JUNGLE CROW (*Corvus macrorhynchos* WAGLER)¹

Previous Work. Very little is known about the breeding habits of the Jungle Crow. Hume (1873 : 411-413) was perhaps the first ornithologist to collate the data available on the subject, but many interesting aspects were left untouched. Many workers have written on the subject since then (Butler 1875 ; Davidson & Wenden 1878 ; Cripps 1878 ; Scully 1879 ; Vidal 1880 ; Reid 1881 ; Swinhoe & Barnes 1885 ; Barnes 1886 ; Davidson 1882 ; Taylor 1887 ; Hume 1889 ; Munn 1894 ; Jesse 1902 ; Ferguson 1903-4 ; La Touche 1906 ; Dewar 1909, 1929 ; Whistler 1928 ; Baker & Inglis 1930 ; Inglis 1931-34 ; Ali & Abdulali 1937 ; Ali 1946, 1953 ; Baker 1917, 1922, 1932 ; Aitken 1947 ; Bates & Lowther 1952, to cite a few), but it is still far from exhausted.

Breeding season. The breeding season of the Jungle Crow differs in different parts of India. Hume (1873 : 411 ; 1889 : 4) writing about the breeding season of the Jungle Crow stated : ' March to May is, I consider, the normal breeding-season ; in the plains the majority lay in April, rarely later, and in the hills in May ; but in the plains a few birds lay also in February.' According to Whistler (1928 : 4) the various races of Jungle Crow throughout India agree for the most part in laying their eggs from March to May, but in the plains a few nests will be found with eggs as early as the middle of December. Baker (1932 : 7-9) writing on the subject stated : ' The Northern Indian race breeds during December and January in Bengal and I have myself taken eggs as early as the 27th November in Eastern Bengal. In Bihar a few birds breed as early as the second week in January, but over the rest of its range across India as far west as the United Provinces and as far south as the Central Provinces the normal breeding season seems to be late March to early May, most eggs being laid in April before the 20th of

¹ This section is based almost entirely on observations made when I was working with the Virus Research Centre, Poona.

that month. . . . The breeding season of the Jungle Crow throughout southern India seems to be March, April and May. Major C. E. Williams took for me a fine series of their eggs between 9th of March and 3rd of May ; Bourdillon and others took eggs from 27th February to 20th May in Travancore. Davidson and Miss Cockburn give April and May as the breeding months in the Nilgiris, though Darling took a clutch of six eggs at Ooty as early as the 12th of February. In the South of the Bombay Presidency most eggs are laid in April and March.' Ali (1946 : 5) on the other hand stated : ' The normal breeding season in Peninsular India is between December and March or April ; North of Ganges and in Assam and Burma it is usually later, between March and May.'

In and around Vellore (N. Arcot, Madras) where the present study was made the breeding season in 1956 lasted from early March to early June. Most eggs were found in April-May and most young in May-June.

Mating. By the beginning of March small flocks of Jungle Crow which habitually feed in cultivated fields, scrub jungle, and often in and around villages in company with House Crows tend to disintegrate into pairs. Partners are sought out and courted. The pair keep fairly close together. The Jungle Crow, like the House Crow, appears to be rather discreet about the display of connubial affection and sexual intercourse. In spite of its being one of the common birds of India very few people observe the Jungle Crow copulating. Copulation usually takes place in trees, sometimes on house tops or on the ground, and occasionally in the middle of a road (Berriff 1927). The presence of others of the species while the copulation is in progress is ignored nonchalantly. The sexual union may or may not be preceded by a mild head-tickling. The copulation is done in the usual bird fashion, very much like that of the House Crow. No particular timings are observed for the act and the conjugation is very frequent when the nest is under construction.

Nest building. Unlike the House Crow, the Jungle Crow seems to be rather selective about the site of the nest. Normally a fork high up in a tall tree is selected on the outskirts of, or near, human habitation, in well-wooded open land, cultivation, or waste ground. In localities where tall trees are wanting or have already been occupied by others of the species smaller trees are made use of. It does not as a rule build its nest in buildings. Only once has a nest on the top of an old building been recorded (Baker 1932 : 8), but there too it built in a small bunch of *Ficus* growing on the roof. Usually, no other sites are selected, but I saw one nest of the Jungle Crow in the compound of the Institute of Veterinary Preventive Medicine, Ranipet, Madras, which was placed in a loop made of two insulated electric mains.

It is difficult to say which partner has the greater say in selecting the site, perhaps the female. But once the site is selected both partners take a keen interest in building the nest. Dry twigs and sticks are picked up from under the trees and hedges around the field and farm. If fallen sticks are not readily available, twigs from trees and sticks from fences and hedges are wrenched off. Wires are also occasionally made use of. Both the birds go hunting for building material but separately. The female appears to do the bulk of the construction work. The male takes part in actual construction to the extent of arranging the twigs he has brought. If the female happens to be at work on the nest when the male arrives with a twig, he prefers to pass it on to her and go away in search of more. The female may at times rearrange the stick the male has added in her absence. As the twigs are fairly thick she often finds it hard to adjust or bend a refractory stick and may take a few minutes to arrange it to her satisfaction. During construction the birds do not seem to be in much of a hurry. There are long intervals between spurts of building activity.

In the earlier stages of construction the nest has the appearance of a bunch of sticks put loosely in a fork their ends projecting in all directions. As more sticks are added and arranged it gradually acquires the shape of a somewhat rounded platform, loosely attached to one or both the limbs of the fork with intertwining twigs and sticks. Further sticks are added on the periphery and the sides, moulding it finally to a massive, broad, cup-shaped structure 35 to 45 cm. in diameter and 12 to 15 cm. deep, with walls 10 to 12 cm. thick. The inner cavity is lined with coconut fibre, grasses, grassroots, palm fibre and bark, and human, horse, or other animal hairs which are sometimes pulled off the backs of live animals or skins laid out for drying (Hutton 1848 : 9). The finished inner cavity is about 15 to 18 cm. across and 10 to 14 cm. deep. It usually takes a pair about seven to twelve days to construct a nest complete with lining.

Territory. There appear to be no territorial troubles. Others of the species are never attacked if and when they visit the nesting tree. Although highly gregarious otherwise, while breeding the Jungle Crow certainly appears to respect the privacy of others of the clan and two pairs will never be found nesting in the same tree. All other birds, as long as they are not birds of prey, are welcome to use the nesting tree in any way they think fit. Birds of prey are always chased and driven off. Other birds including the House Crow seem to be afraid of the Jungle Crow and do not normally dare to come near its nest. Once I saw a female koel resting in the shade of a large Banyan tree in which the nest of a Jungle Crow was located. One of the parents was sitting in the nest incubating and did not pay any attention to the koel.

Laying and clutch size. Egg-laying starts with the completion of the nest and sometimes even before the lining is complete. Three to five eggs are generally laid, at intervals of twenty-four to forty-eight hours (Table II).

TABLE II
LAYING PATTERN AND CLUTCH SIZE OF JUNGLE CROW (*Corvus macrorhynchos*)

Nest No.	1st egg laid on	2nd egg laid on	3rd egg laid on	4th egg laid on	5th egg laid on	Total No. laid
1	24/iv	25/iv	26/iv	28/iv	—	4
2	17/iv	18/iv	20/iv	—	—	3
3	17/iv	18/iv	19/iv	20/iv	—	4
4	28/iv	30/iv	1/v	2/v	—	4
5	27/iv	28/iv	29/iv	1/v	—	4
6	3/v	4/v	6/v	—	—	3
7	24/iv	25/iv	26/iv	27/iv	28/iv	5
8	8/v	9/v	10/v	11/v	—	4
9	8/v	9/v	10/v	11/v	—	4
10	27/iv	28/iv	29/iv	30/iv	1/v	5
11	27/iv	28/iv	29/iv	—	—	3
12	27/iv	28/iv	29/iv	30/iv	—	4

Occasionally six (Darling, cited by Hümé 1889 : 7) and rarely two (Dewar 1909 : 238-39) are also laid. Baker (1932 : 8) is of the opinion that 'cases in which two eggs have been reported as incubated are probably incomplete clutches'. Recent researches, however, indicate that a number of environmental factors are responsible for the determination of clutch size in an indeterminate layer like this crow. It will not perhaps be entirely irrelevant to mention here some of the important factors in brief, although they have not been directly observed in connection with the present work :

1. Availability of food in the breeding area :

This is perhaps the most important factor governing clutch size. Abundance of food in the locality appears to induce birds to lay bigger clutches than normal. In a rodent plague the clutch of birds living on them may be double the usual figure or even greater, a phenomenon recorded from the arctic, temperate, and tropical regions (Schneider 1928 ; Elton 1942 ; Moreau 1944). Even the quality of the food available sometimes affects clutch size (Kluijver 1933, cited by Lack 1947a).

2. Climatic conditions :

Climatic conditions varying annually appear to influence the clutch size (Jourdain & Witherby 1918 ; Lack 1947b ; Parkhurst & Lack 1946 ; Walkinshaw 1944). Even a change of season may affect clutch size in double brooders (Stresemann 1928 ; Kendeigh 1941 ; Lack 1947a).

3. The age of the bird :

First year birds lay smaller clutches than older individuals (Ruiter 1941 ; Kluijver 1933 ; Wissel 1927). Very old individuals also tend to have reduced clutches (Jourdain 1925).

4. Individual peculiarities :

Sometimes it is observed that an individual bird which laid an unusually large or an unusually small clutch on one occasion tends to do the same on other occasions (Lack 1947a).

Regarding the determination of the average clutch size, Lack (1947a : 315-319) writes : ' I believe that, in nidicolous species, the average clutch size is ultimately determined by the average maximum number of young which the parents can successfully raise in the region and at the season in question.' He further states : ' The limitation of clutch size must be regarded not as a negative, the inability to produce more eggs, but as a positive act, the cessation of laying '. He also suggests that, in indeterminate layers, laying presumably ceases in response to either visual or tactile stimuli from the nest.

The eggs are broad ovals somewhat compressed towards one end. The shell is compact, fine, and slightly glossy. The ground colour is usually bluish green, olive-green, sometimes almost blue (Baker 1932 : 8), or olive or stone colour (Dewar 1929 : 26). They are blotched, streaked, smeared, freckled with brown or pale faded purple. The size, shape, ground colour, and the design, intensity, and shade of the markings varies a good deal in eggs from different clutches and, sometimes, in the various eggs of the same clutch. The average of thirty-seven eggs measured was 30.3×42.1 mm.

The Jungle Crow does not appear to be suspicious of or bear any malice towards the Koel (*Eudynamis scolopaceus*). I did not come across a koel's egg in any of the nests, possibly because extremely few nests of this species with eggs are left till June, when the majority of the koel eggs were met with in House Crows' nests. Instances are, however, on record (Ali & Abdulali 1937 : 91 ; Jerdon 1877 : 296) of koel parasitising the brood of this species.

Incubation. The female starts sitting as soon as the first egg is laid in the nest. Incubation for the most part is done by the female. The male relieves her at intervals. The birds are very close sitters and leave the nest unattended only in the hottest part of the day, when one or both the birds mount guard on the nest sitting in a shady spot near-by. Unlike the House Crow the bird sitting in the nest does not abandon the nest as soon as someone starts climbing the nesting tree. The incubating bird keeps sitting in the nest till the climber is very close. After leaving the nest they make menacing threats of attacking the human

intruder but seldom strike. The Jungle Crow does not appear to take much notice of a slight change in the appearance of the contents of the nest. I have painted its eggs scarlet with transparent water colours by ones and twos in a clutch in several cases, and in one case all the five, without affecting the composure of the owners in the least. They neither deserted the nest nor made any attempt to destroy or get rid of the painted eggs. They devoured a Paddy Bird (*Ardeola grayii*) egg placed in an empty nest, but accepted and incubated one when substituted for one of their own in a clutch of four.

Period of incubation. In nine cases out of twelve the first fledgling hatched out after eighteen days of the laying of the first egg, in one case in seventeen, and in another in nineteen days (Table III).

TABLE III
PERIOD OF INCUBATION OF JUNGLE CROW (*Corvus macrohynchos*)

Nest No.	1st egg laid on	1st fledgling hatched on	Period of incubation in days
1	24/iv	12/v	18
2	17/iv	5/v	18
3	17/iv	5/v	18
4	28/iv	16/v	18
5	27/iv	16/v	19
6	3/v	21/v	18
7	24/iv	12/v	18
8	8/v	26/v	18
9	8/v	25/v	17
10	27/iv	15/5	18
11	27/iv	did not hatch	
12	29/iv	17/v	18

One clutch that did not hatch out was incubated for twenty-nine days before it was finally deserted.

The young in the nest. The young hatch out one after the other, at intervals of twenty-four to forty-eight hours. The newly hatched young are entirely devoid of nestling down. They are unable to stand up and lie helplessly on their delicate and almost transparent abdomens. The body is light flesh-coloured. The eyes are closed. Beak and claws are soft and fleshy, and are of the same colour as the rest of the body. The neossoptiles make their first appearance some time between forty-eight to seventy-two hours after hatching. They consist of prepennae and are duly replaced by regular contour feathers (teleoptiles). The remiges and rectrices appear in the second week in the form of gramophone-needle-like structures at first, and then at the needle points appear tufts of hair-like feathers (barbs). At this stage, with elongated stem

and tufts of hair at the distal end, they resemble miniature artists' brushes arranged in rows of uneven sizes. The tuft gradually elongates into rachis and vane, while the stem ultimately forms the calamus. By the end of the fourth week the young are fully fledged. The colour of the fully fledged young is similar to that of the adult bird.

Both the parents feed the young. The young are unable to accept food till they are twenty-four to forty-eight hours old. In the earlier stages the food hunting trips of the parents are arranged in such a way that one or the other of them is always available to guard or warn the nestlings against predators and intruders.

All the young that hatch out do not live to leave the nest (Table IV). The majority of deaths occur in the first fortnight and mainly for want of food. Rarely is death due to a chance fall or some marauder's attack.

TABLE IV
NESTING SUCCESS

Nest No.	No. of eggs laid	Incubation period in days	Total hatch	Fledglings that survived
1	4	18	4	3
2	3	18	3	3
3	4	18	4	3
4	4	18	4	2
5	4	19	4	4
6	3	18	2	2
7	5	18	4	3
8	4	18	3	3
9	4	17	3	3
10	5	18	4	3
11	3	19	did not hatch	
12	4	18	3	2
Total	47		38	31 =66%

The parent birds usually cannot meet the full demand of a clutch of five and sometimes even four nestlings ; unless of course there is an abundance of food in the locality. The parents seem to exercise no discrimination whatsoever in feeding them, and stuff the food in the gaping mouth of one of them, presumably the nearest, until the supply is exhausted or the one being fed refuses to swallow any more. This is repeated at every visit and the young which are not fed until their stronger brethren have received all they can take go to the wall in the struggle for existence in the nest. The dead are thrown out without the slightest concern on the part of the parents. The nestlings who survive remain in the nest for three to four weeks. A three- to four-week old nestling is fully fledged and can fly short distances, if forced to do so. Generally

before leaving the nest they stay around in the branches of the nesting tree where they are fed by the parents. Even after leaving the nest they stick close to the parents, usually the mother, for a few weeks and follow her wherever she goes. As soon as she picks up a little bit of food the demand for it by the young starts. Generally the mother transfers the morsel to the young.

Nesting success. Nesting success in the Jungle Crow depends on a number of factors, the most important ones being the amount of food available for the young at nestling stage, fertility of the eggs laid, and interference by predators. In the present study a total of forty-seven eggs were laid in twelve nests. A total of thirty-one fledglings survived (Table IV). It roughly works out to sixty-six per-cent.

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